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10/656,355	09/05/2003	Elizabeth Matheson	303449.01	7829

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EXAMINER	
ARCOS, CAROLINE H	
ART UNIT	**PAPER NUMBER**
2195	

NOTIFICATION DATE	DELIVERY MODE
11/20/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/656,355	MATHESON ET AL.	
	Examiner	Art Unit	
	Caroline Arcos	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *30 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-18 and 20-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-18 and 20-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1, 3-18 and 20-30 are pending for examination. Claims 2 and 19 are cancelled on 8/30/2007.

Specification

2. The disclosure is objected to because of the following informalities:

Page 9, line 9, "the task tasks", one of the words "task" has to be deleted.

Applicant is required to review and correct any other mistake in the specification.

Claim Objections

3. Claims 1, 11, 15,18 and 20 are objected to because of the following informalities:

   a. As per claim 1; Line 5, there is more than one selection criteria; hence, it should be selection criteria<u>s</u>.

   b. As per claim 11; line 1, possible 112 2nd paragraph issue for the lack of antecedent basis for "the resource information".

   c. As per claim 15; line 3, "Resource descriptor" is not mentioned in the specification. It is a possible 112 1st paragraph issue.

   As per claim 18, Line 3, it is unclear of what is" Task objects". Are they "task containers" or different? Furthermore, line 5, there is more than one specified function; hence it should be specified function<u>s</u>.

d. As per claim 20, line 1, it is a system claim that is dependent on a cancelled claim (claim 19)..

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

5. Claims 1,3-18, and 20-25 are rejected under 35 U.S.C 112; second paragraph, as being Indefinite for failing to particularly point out and distinctly claim the subject matter Which, the applicant regards as the invention.

a. The claim language in the following claims is not clearly understood:

i. as per claim 1, line 2, it is unclear whether each task container has one task or plurality of tasks in each task containers.

Line 3, it is unclear whether" resource containers" are the actual resources in a task containers or they are just resource information stored in task containers. It is not clearly understood the relationship between the task containers and the resource containers.

Line 4, it is unclear whether "each resource container" is the same resource containers as "a plurality of resource containers" of line3 (i.e. if it is the same, it should be referred as each said resource container).

Line 5, it is unclearly what is meant by "the represented task " is it one of the plurality of tasks in a ready state or execution state?

ii. As per claim 3, it has the same deficiency as claim 1. Furthermore, line 4, it is unclear whether " AND" relationship is done for the second time after it has been done in claim 1 or is it done one time only (i.e. if "AND" relationship is one time selection criteria not a multiple of times, it should be mentioned whether in claim 1 or claim 3 and not both claims).

iii. As per claim 18, line 4, it is unclear whether "one or more resource objects" are the actual resources in each task object or they are just resources information stored in task object. It is not clearly understood the relationship between the task objects and the resource objects. Furthermore, it is unclear what is meant by"resource objects". Are they "resource containers" or different?

Line 5, it is not clearly understood whether "the task" referred to is one of the representing tasks or one of the task objects.

Appropriate corrections are required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 3-18 and 20-30 rejected under 35 U.S.C. 103(a) as being unpatentable over Sankaranarayan et al. (Sankaranarayan) (WO 01/84301), in view of Walker et al. (Walker) (US 5,963,911).

8. Walker was cited in the last office action.

9. As per claim 1; Sankaranarayan teaches the invention substantially as a method comprising: receiving a plurality of task containers representing a plurality of tasks (500, Figure5), where each task container is a grouping of a plurality of resource containers (400(1), Fig.4; 402(1), Fig. 4),

wherein each resource container specifies one or more resources required for the represented task (page 18, lines 9-12; Page 25, lines 7-9) and selection criteria to select from the one or more resources (page 16, lines 13-14; page 16, lines 22-25), and wherein at least one of the selection criteria specifies an 'AND' relationship indicating that all of a plurality of specified resources are required to

perform the represented task (Page 62, lines 19-20).

10. Sankaranarayan did not teach generating a cost for each task based on probabilities that the task will influence each other task in the plurality of tasks using the containers; and scheduling the task with the least cost.

11. However, Walker teaches generating a cost for each task based on probabilities that the task will influence each other task in the plurality of tasks using the containers (Col.2, lines 38-41; Col. 2, 55-59; where possible combination of jobs are jobs that don't compete with each other for the resource); and scheduling the task with the least cost (Col.2, lines 60-61).

12. It would have been obvious to one of an ordinary skill in the art at the time the invention was made to have combined the teaching of Sankaranarayan and Walker because Walker 's teaching of generating a cost for each task would improve the scheduling techniques and the CPU usage for Sankaranarayan 's system.

13. As per claim 3, Sankaranarayan teaches the each selection criteria specifies a relationship selected from a group consisting of comprises an "AND" relàtionship indicating that all of one a plurality of the resources are required to complete the represented task (Page 34, lines 10-11);

an "XOR" relationship indicating that only one of the one or more resources is

required to complete the represented task (Page 25, line 9); and

an "OR" relationship indicating that one or more of the one or resources are required to complete the represented task(Page 62, lines 21-24).

14. As per claim 4, Walker teaches that receiving a timeslot definition associated with each of the plurality of tasks or resources, the timeslot definition defining a required timeslot for the associated task or resource (Col.1, lines 65-67).

15. As per claim 5, Walker teaches that the timeslot definition comprises an early start indicator (Col.1, lines 63-64; col.18, lines 45-46), a late finish indicator (col.18, lines 45-46), and a duration indicator (Col.2, lines50-51).

16. As per claim 6, Walker teaches that receiving a constraint describing a time constraint between two tasks in the plurality of tasks; and scheduling the two tasks based on the constraint (abs, lines 2-4; Col.2, lines 1-5; col.17, lines 52-55).

17. As per claim 7, Walker teaches that generating comprises:

determining a probability that a first task in the plurality of tasks influences a second task in the plurality of tasks based on the resource information (Col.2, lines 35-41; Col. 2, 55-59); and

adjusting the cost of the first tasks based on a function of the probability that the first task in the plurality of tasks influences the second task in the plurality

of tasks(Col.14, lines 37-38; col.21. lines 59-64).

18. As per claim 8, Walker determining a probability that a first task in the plurality of tasks supports a second task in the plurality of tasks based on the resource information; and

if the first task supports the second task, reducing the cost of the first task based on a function of the probability that the first task supports the second task (Col. 2, lines 38-41; Col.21, lines 49-52).

19. As per claim 9, Walker teaches determining a probability that a first task in the plurality of tasks competes with a second task in the plurality of tasks based on the resource information; and

if the first task competes with the second task, increasing the cost of the first task based on a function of the probability that the first task competes with the second task (Col.2, lines 20-23; .Col.18, lines 14-19; col.21. lines 59-64).

20. As per claim 10, Walker teaches selecting a first task from among the plurality of task(Col.3, lines 29-31); for each of the other tasks in the plurality of tasks, determining a pair-wise probability, the pair-wise probability representing a probability that the first task will compete with the other task(Col.2, lines 20-26); and

summing the pair-wise probabilities to form a total cost associated with the

first task(abs, Lines 6-7; Col.2, lines 2-5).

21. As per claim 11, Sankaranarayan teaches the resource information comprises preference information describing preferences of the one or more resources (Page 62, lines 24).

22. As per claim12, Sankaranarayan teaches that the generating comprises applying preference values to the tasks (Page 25, lines 1-2).

23. As per claim 13, Walker teaches that the generating comprises tabulating a cost associated with each pair of tasks (Col.5, lines 40-41; Col. 7, lines 37-38).

24. As per claim 14, Walker teaches removing the scheduled task from a main task log (Col. 16, lines 24-27);

adjusting probabilities associated with resources remaining in the main task log based on the scheduled task (Col.4, lines 4-7); and

re-generating a cost for each task based on probabilities that the task will influence each other task in the plurality of tasks using the resource containers (Col.18, lines 14-19).

25. As per claim 15, Sankaranarayan teaches a computer-readable medium storing processor-executable instructions (24(1), 28, Fig. 1)for performing a method

comprising:

receiving a plurality of first resource descriptors describing first resources associated with a first candidate task (400(1), Fig.4; 502(1), Fig.5) and selection criteria defining how the first resources are to be selected from the plurality of first resources (page 16, lines 13-14; page 16, lines 22-25), wherein at least one of the selection criteria is an 'AND' relationship indicating that all of a specified plurality of the first resources are required to perform the first candidate task(Page 39, lines 20-25);

receiving a second resource descriptor describing a second resource associated with a second candidate task(Page 40, lines 1-2); and

scheduling one or more of the first candidate task and the second candidate task, wherein at least all of the plurality of first resources specified in the 'AND' relationship are allocated to the first candidate task in accordance with the selection criteria(Page 39, lines 20-25).

26. As per claim 16, Sankaranarayan teaches identifying one or more of the first resources that are not the same as the second resource and that satisfy the selection criteria (Page 39, lines 20-25; Page 40, lines 1-2).

27. As per claim 17, Walker teaches receiving a current schedule state having currently scheduled tasks and currently scheduled resources (Col.16, lines 24-27);

determining whether the first candidate task and the second candidate task

are viable based on the current schedule state (Col.3, lines 37-41; col.14, lines 37-38); and

eliminating one or more of the first or second candidate task from consideration if the one or more of the first or second candidate task is not viable (col.12, lines 44-51).

28. As per claim 18, Sankaranarayan teaches a system for scheduling a plurality of tasks (22, Fig.1), the system comprising:
a task log including a plurality of task objects representing tasks (500, Fig. 5), each of the task objects having one or more resource objects(102, Fig.12) each resource object representing a resource that is selectable for the associated task according to a specified function of the one or more resource objects(502(1), Fig.5; 502(2), Fig.5), and wherein at least one specified function is an 'AND' function indicating that all of a plurality of resource objects are required for the task(Page 39, lines 20-25),

29. Sankaranarayan did not teach that each of the task objects operable to return a probability that scheduling of the task will influence another task;

a cost generator operable to generate a cost for each of the tasks based on probabilities that the task will influence each other task; and

a scheduling engine operable to schedule the task with the least cost.

30. However, Walker teaches that each of the task objects operable to return a probability that scheduling of the task will influence another task (Col.2, lines 38-41; Col. 2, 55-59);

a cost generator operable to generate a cost for each of the tasks based on probabilities that the task will influence each other task (Col.2, lines 38-41; Col. 2, 55-59); and

a scheduling engine operable to schedule the task with the least cost(Col.2, lines 60-61).

31. As per claim 20, Sankaranarayan teaches each specified function is selected from a group consisting of:

an "AND" function indicating that all of the plurality of resources are required(Page 34, lines 10-11);

an "XOR" function indicating that one and only one of the plurality &resources is required(Page 25, line 9); and

an "OR" function indicating that at least one of the plurality of resources is required(Page 62, lines 21-24).

32. As per claim 21, Walker teaches the cost generator is further operable to calculate pair-wise costs representing a cost of scheduling a first task relative to a second task (Col.2, lines 20-26).

33. As per claim 22, Walker teaches that the cost generator is further operable to tabulate pair-wise costs representing a cost of scheduling a first task relative to a second task and generate a total cost associated with each of the tasks (Col. 2, lines 20-26; col.2, lines 52-54).

34. As per claim 23, Walker teaches that task object further comprises time constraint information indicating at least one time constraint between two of the tasks(abs, lines 2-4; Col.2, lines 1-5; col.17, lines 52-55).

35. As per claim 24, Sankaranarayan teaches the task log further comprises a hierarchical arrangement of the task objects and the resource objects (Fig.4; Fig. 5).

36. As per claim 25, Walker teaches each task object is operable to return a probability that the task object competes with another task object (Col.2, lines 20-23; Col. 18, lines 14-19).

37. As per claim 26, Walker teaches generating a cost associated with each of a plurality of tasks to be scheduled(Col.2, lines 52-54),
wherein each task requires one or more resources, and wherein at least one of the tasks requires a plurality of resources(Col. 2, lines 15-20), and wherein generating the cost of the at least one task is based on a probability that other

tasks require one or more of the plurality of resources(Col.2, lines 6-7), executing a minimum cost task(Col.2, lines 8-12); and

scheduling the minimum cost task if the minimum cost task successfully executes(Col.2, lines 60-61).

38. As per claim 27, Walker teaches determining a pair-wise probability representing a probability that a first task in the plurality of tasks conflicts with a second task in the plurality of tasks (Col.2, lines 20-26; Col.18, lines 14-19).

39. As per claim 28, Walker teaches adjusting the pair-wise probability in response to scheduling the minimum cost task (Col.2, lines 8-12; Col. 21, lines 61-67).

40. As per claim 29, Sankaranarayan teaches determining the costs based upon preference weights assigned to the plurality of tasks (Page 25, lines 1-2).

41. As per claim 30, Walker teaches determining viability of each task in the plurality of tasks (Col.14, lines37-38).

Response to Arguments

42. Applicant's arguments filed on 08/30/2007 with respect to claims 1, 3-18, and 20-30 have been considered but are moot in view of the new ground(s) of rejection.

43. Applicant's amendment necessitated the new ground(s) of rejection presented in this office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP ~ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

44. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

45. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure

TITLE: ("CPU reservations and time constraints: Efficient, predictable scheduling of independent activities", Jones et al, ACM, 1997, Pages 198-211).

TITLE: ("An algorithm for optimal projection scheduling under multiple resource constraints", Davis et al, Management science, 1971, Pages B-803 –B-816)

46. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caroline Arcos whose telephone number is 571-270-3151. The examiner can normally be reached on Monday-Thursday 7:00 AM to 5:30 PM.

47. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

48. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Patent examiner

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